

Screening eucalypts for growth-strain

Nicholas Davies, Monika Sharma, Clemens Altaner and Luis Apiolaza

New Zealand School of Forestry, University of Canterbury, New Zealand

ntd14@uclive.ac.nz

Eucalypt species are fast growing and can produce high quality timber for appearance and structural products including LVL.

Large growth-strains displayed in eucalypts, as can be seen in Figure 1, are associated with a number of wood defects (Yamamoto 2007).

Developments at the University of Canterbury have resulted in a unique growth-strain measurement method, dubbed the “Splitting” test (Figure 2). For the first time rapid growth-strain assessment of young trees (Chauhan 2010, Entwistle 2014) is possible.

We have conducted a study substantially larger than any preceding attempts (Figures 3), investigating growth-strain and other wood properties of more than 500 *Eucalyptus bosistoana* at an early age (less than 2 yrs).



Figure 2: Growth strain release of a Eucalypt during the splitting test. The opening shows there was substantial stored strain energy within the uncut stem.



Figure 1: Growth strain release of a Eucalypt: New Zealand Farm Forestry Association

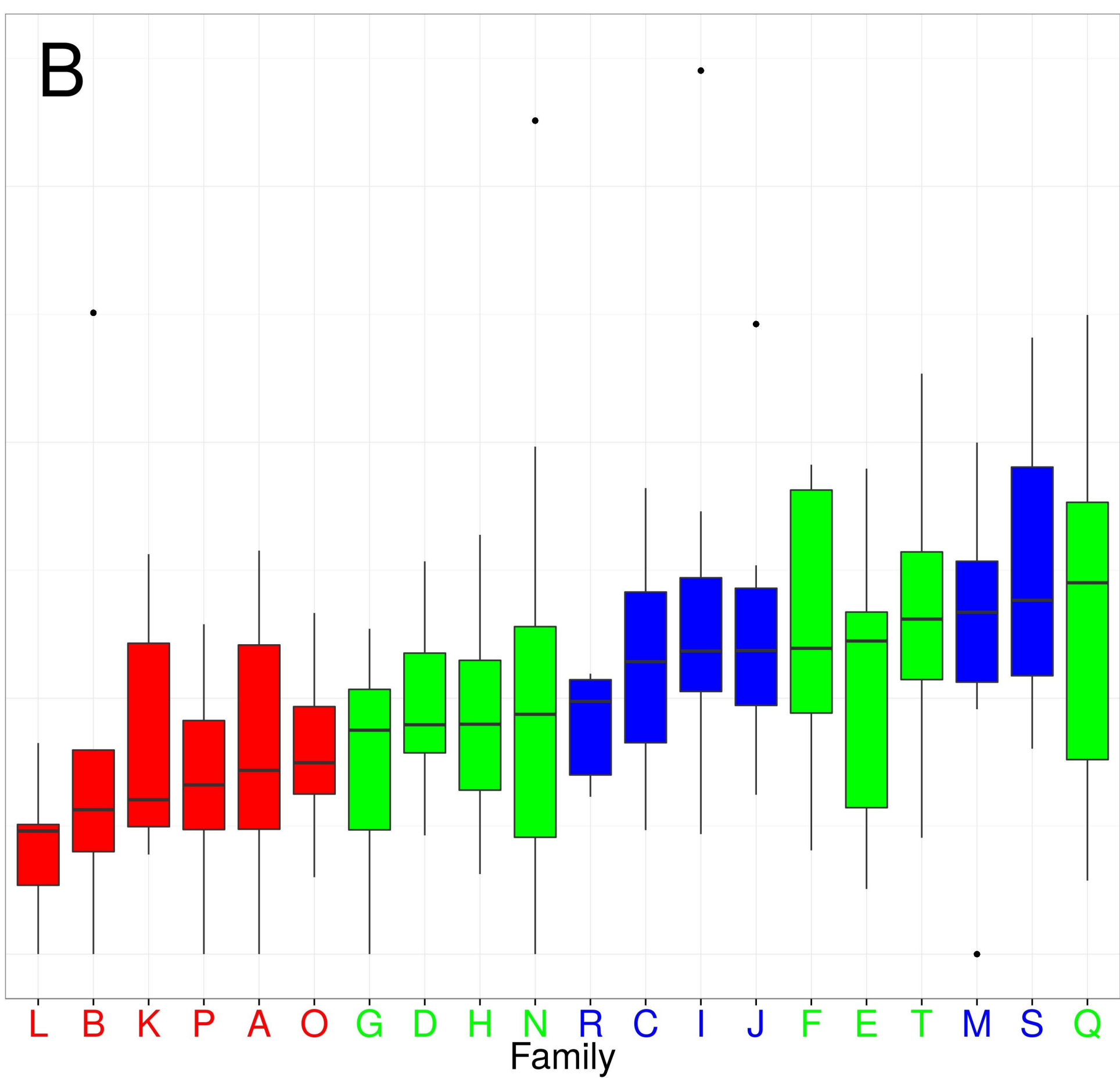
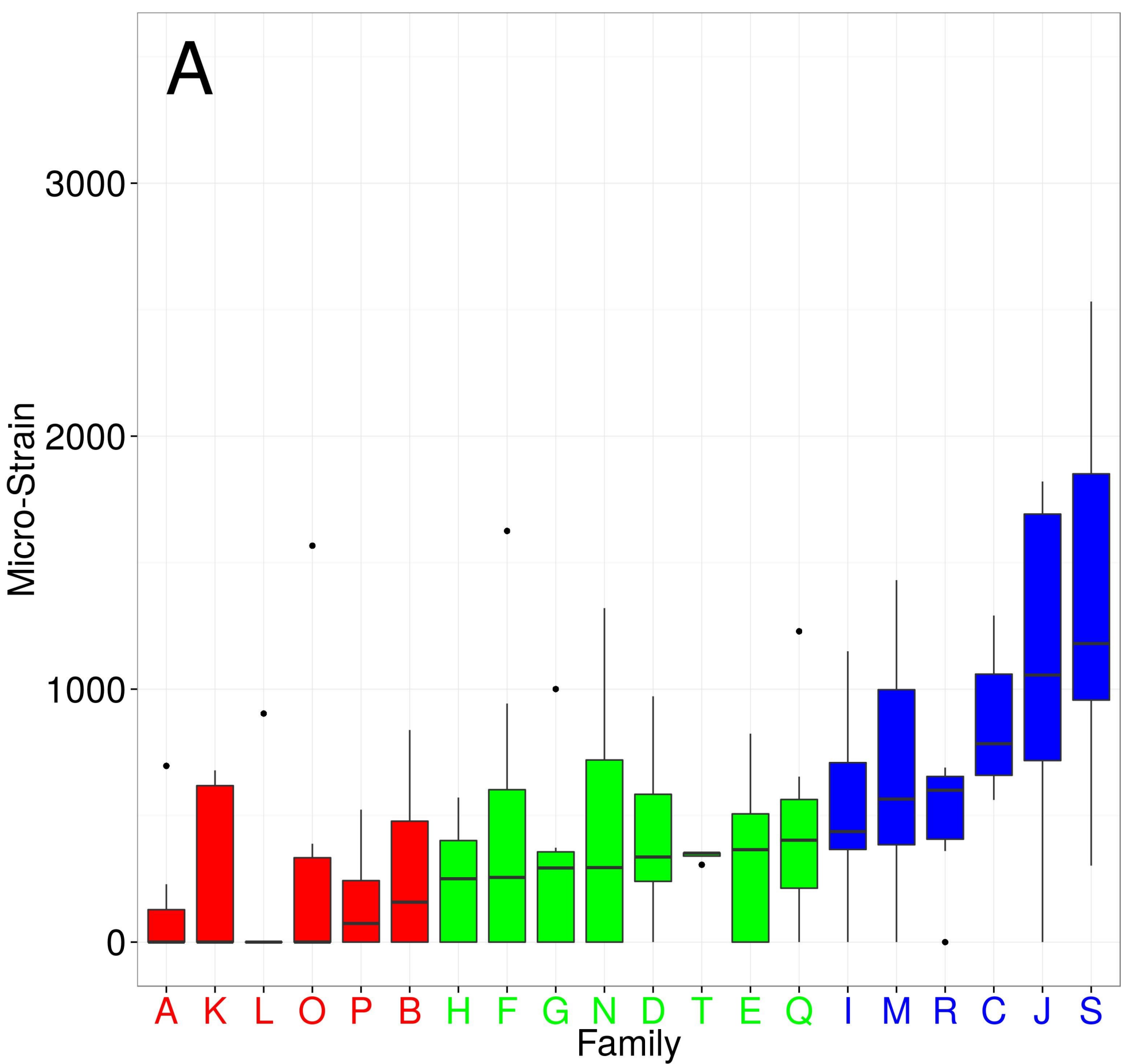


Figure 3: High (blue), medium (green) and low (red) growth-strain families grown from seed **A** and the same individuals grown from coppice **B**. Note the large number of trees in the low growth-strain families showing closure (zero) during the splitting test and the higher magnitudes of growth-strain when grown form coppice (~200 plants from seed and ~200 from coppice).

Results

- Growth-strain is heritable (Figure 3)
- Family rankings vary little whether grown from seed or coppiced from existing root systems (Spearman coefficient of ~0.77).
- Acoustic velocity showed a reasonable correlation with growth-strain
- Basic density showed negative correlation with growth-strain
- Diameter showed poor correlations
- All predictors were less strongly correlated with coppiced trees.
- Testing for all of these properties can be conducted in less than five minutes per sample
- Testing at an age as early as one year, allowing a sizable wood improvement program

References

Yamamoto, H. (2007) Tree growth stress and its related problems. The Compromised Wood Workshop, Wood Technology Research Centre, University of Canterbury. 197-214.

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Figure 4: Woodville trial

Future Work

- Largest collection of seed in the world for a number of eucalypt species including *Eucalyptus bosistoana*
- “Splitting” test, screening of the entire genetic stock is now a practical solution to remove growth-strain induced wood defects.
- 11,000 tree breeding trial consisting of ~200 families each with 50 - 60 half sibling replicates of *Eucalyptus bosistoana* (Figure 4).
- Harvesting at an age between 18 and 24 months.